REMARKS

Entry of the foregoing and reconsideration of the above-identified application are respectfully requested. Since the instant amendments place the claims in condition for allowance, or at the very least place the claims in better condition for appeal, entry is consistent with 37 C.F.R. §1.116.

The claims have been amended to recite that the nucleic acid is obtained from the family *Scrophulariales*, and more specifically, from *Antirrhinum majus* in claims 27-33. Such nucleic acid are described in the specification. *See, e.g.*, the species used in the instant Examples are *Antirrhinum majus* and are identified as such in <213> in the Sequence Listing. *Antirrhinum majus* is a species of the family *Scrophulariales*. Claims 31-35 are directed to the nucleic acid encoding the sequence of SEQ ID NO:2. Claim 36 is directed to the nucleic acid sequence of SEQ ID NO:1. In claims 37, 39, 41 and 43, the claimed nucleic acid must include at least one of the specified sequence of SEQ ID NOs: 3-7. In claims 38-43, the claimed nucleic acid must encode a sequence having a high degree of identity with that of SEQ ID NO:2. Support for these claims is found at the very least at page 7, lines 3-10. No new matter is thus added by this amendment.

Claims 1-9 and 18-26 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not described by the specification. This rejection is rendered moot by the instant amendment.

The Examiner asserts that the recitation of "preferentially using chalcones as substrates" in claims 1, 2, 4, 5, 18, 19, 20, 21 and 22 is new matter. This language has

been deleted from the claims. This recitation is believed to be fully supported, but has been deleted to expedite prosecution.

Claims 5 and 21 are further said to include new matter by the recitation of "high stringency." It is believed that the rejection should have been for claims 4 and 21, since "high stringency" does not appear in claim 5. This aspect of the rejection is also now moot in view of the deletion of these claims.

Withdrawal of the rejection under §112, first paragraph, is respectfully requested and believed to be in order.

Claims 1-9 and 18-26 have been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. This rejection is now moot in view of the instant amendment.

The objected terms "preferentially" and "high stringency" do not appear in any of the pending claims. This rejection has thus been rendered moot.

Withdrawal of the rejection of record is thus respectfully requested and believed to be in order.

Claims 1-9 and 18-26 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly not being enabled by the specification. This rejection is respectfully traversed.

According to the Examiner, the specification is enabling for a nucleic acid encoding a protein wherein the nucleic acid comprises a sequence encoding SED ID NO:2. However, the specification allegedly does not enable other nucleic acids encoding such proteins or other nucleic acids encoding proteins having the ability to synthesize any other aurones. The specification is said to teach a single cDNA molecule (SEQ ID NO:1) which

encodes the polypeptide of SEQ ID NO:2. The polypeptide encoded by SEQ ID NO:1 has the ability to synthesize aureusidin by using chalcones as substrates. According to the Official Action, the specification is allegedly silent to other polypeptides that can synthesize aureusidin by using chalcones as substrates, or any polypeptide that has the ability to synthesize any other aurones (other than aureusidin) from chalcones. While there are said to be many polyphenol oxidase molecules known in the art, there is allegedly no guidance that would lead one skilled in the art to select the nucleic acids which encode polypeptide having the ability to synthesize aureusidin using chalcones as substrates, or the ability to synthesize any other aurone using chalcones as substrates.

Undue experimentation would not be required to practice the claimed invention. It is respectfully submitted that one skilled in the art would be able to practice the invention as claimed based upon the teachings of the specification in light of the knowledge in the art. Using the sequence of SEQ ID NO:1 as a probe, one skilled in the art could readily obtain other sequences which could encode a protein having activity to synthesize aurones as instantly claimed. Contrary to the assertion in the Official Action at page 6, 1st paragraph, the specification does describe how one skilled in the art could select nucleic acids having the ability to synthesize aureusidin or any other aurone using chalcones as substrates. This is described in the specification at, for example, page 7, line 37 - page 8, line 11, which states:

> Naturally-occurring genes, that hybridize with nucleic acid having the nucleotide sequence described in SEQ ID NO. 1 and that encodes an enzyme having activity to synthesize aurones by using chalcones as substrates, are obtained by

> preparing a cDNA library or genomic DNA library from a plant which has ability to produce a protein having aurone synthase activity in accordance with a conventional method, and then screening the library by using, for example, cDNA or its fragment having the nucleotide sequence shown in SEQ ID NO. 1 as a probe. The above-mentioned conditions can be used for the hybridization at this time.

According to the specification, the aurone synthase can also be classified as a kind of polyphenol oxidase. In this regard, the specification further describes at page 8, line 34 - page 9, line 6:

> In this manner, since a conserved region corresponding to the copper-binding region is present in polyphenol oxidase, polyphenol oxidase gene can be obtained according to an established method such as PCR with a primer based on the amino acid sequence of this region (Plant Physiol., Vol. 107, pp. 1083-1089, 1995; Plant Physiol., Vol. 109, pp. 525-531, 1995), and a gene encoding a protein having activity to synthesize aurones can be obtained from the gene obtained as described above.

The specification thus describes and would enable a person skilled in the art to obtain other nucleic acids falling within the scope of the claimed invention. A structural feature of the claimed nucleic acids is described, as well as methods for obtaining them. No undue experimentation would be required for one skilled in the art to obtain and screen polypeptides as required by the claims to obtain the claimed nucleic acids. The assertion that "every possible enzyme" would have to be screened is not accurate. Hybridization with SEQ ID NO:1 would be used as a first screen. Following that screen, activity would be screened.

In addition, the claims of record now recite that the nucleic acid and gene are obtained from *Scrophulariales*. New claims also recite that the nucleic acid are obtained

from *Antirrhinum majus*. These recitations limit the scope of what falls within the scope of the claims and thus what must be screened.

In addition, new claims have been added, wherein the protein encoded by the nucleic acid must include specified sequences of SEQ ID NOs: 3-7. Still further claims have been added which recite that the encoded amino acid sequence has a sequence identity of at least 70%, at least 80% and at least 90% with the amino acid sequence of SEQ ID NO:2. These new claims thus further limit the nucleic acid falling within the scope of the claims.

In addition, the Official Action acknowledges at page 4 that the specification enables a nucleic acid comprising a sequence encoding SEQ ID NO:2. Claims 39-44 would similarly be enabled. These claims requiring sequence identity of at least 70%, at least 80% and at least 90% with the amino acid sequence of SEQ ID NO:2, and further requiring specified sequences, define the structure of the nucleic acid. One skilled in the art could readily obtain and screen nucleic acids falling within the scope of these claims. These claims would be fully enabled to a person skilled in the art. Undue experimentation would not be required.

Claims 1-9 and 18-26 have also been rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not described by the specification. This rejection is respectfully traversed.

The Examiner asserts that the claimed genus is so large as to encompass nucleic acids encoding any possible enzyme that has the recited activity. No structure is said to be

provided to define the claimed nucleic acids. Claims 3 and 20 are said to recite nucleic acids encoding SEQ ID NO:2, but allow for deletion, substitution and/or addition of unlimited amino acids. Thus, no structural limitation is allegedly provided.

The claims have been amended to limit the genes and nucleic acids encompassed by the claims. The claims now require the gene and nucleic acid to be obtained from *Scrophulariales* and, more specifically, from *Antirrhinum majus*. Claims 3 and 20, allowing for unlimited variation, have been deleted. In addition, claims have been added reciting particular amino acid sequences, e.g., claims 31, 36, 37, 39, 41 and 43, and claims requiring a high degree of identity with the sequence of SEQ ID NO:2, e.g., claims 38-43.

The claims are further said to be drawn to genes and encompass genomic coding sequences. However, only the coding portion of the nucleic acid encoding SEQ ID NO:2 is provided. The specification states that the "gene for this aurone synthase, which synthesizes aurones by using chalcones as substrates, was obtained from a cDNA library prepared from the petal of snapdragon, based on the partial amino acid sequences as described above." Page 3, lines 4-8. A "gene" is thus described in the specification and one skilled in the art would be enabled to obtain the full length gene using the sequences identified in the specification. Genes of the invention are also described as being obtainable by hybridization with nucleic acid having the nucleotide sequence of SEQ ID NO:1 under stringent conditions. Page 6, lines 17-34. The specification further states that "to obtain a genomic DNA, a genomic DNA library is prepared from snapdragon in

accordance with a conventional method, and this is then screened in accordance with a conventional method by cDNA or its fragment." Page 7, lines 20-28. The specification further states at from page 7, line 37 - page 8, line 11:

> Naturally-occurring genes, that hybridize with nucleic acid having the nucleotide sequence described in SEQ ID NO. 1 and that encodes an enzyme having activity to synthesize aurones by using chalcones as substrates, are obtained by preparing a cDNA library or genomic DNA library from a plant which has ability to produce a protein having aurone synthase activity in accordance with a conventional method, and then screening the library by using, for example, cDNA or its fragment having the nucleotide sequence shown in SEQ ID NO. 1 as a probe. The above-mentioned conditions can be used for the hybridization at this time.

This description shows that applicants had possession of the claimed gene. By describing a "gene" and by describing how the "gene" is obtained, one skilled in the art could readily obtain the complete genomic sequence. Applicants' description thus shows possession of the genomic sequence at the time the application was filed. The specification thus describes and enables one skilled in the art to obtain the instantly claimed genes.

In view of the above, withdrawal of this rejection under §112, first paragraph, is respectfully requested and believed to be in order.

Claims 1-4, 6-8, 18-21 and 23-25 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Kupper et al (*Journal of Biological Chemistry*, 264(29):17250-58 (1989)). This rejection is respectfully traversed.

Kupper et al is said to teach the gene encoding tyrosinase from Neurospora. This nucleic acid is said to encode a protein having activity to synthesize aurones by using

chalcones as substrates, which polypeptide would allegedly be an amino acid sequence modified by deletion, substitution and/or addition of one or more amino acids relative to SEQ ID NO:2. This polynucleotide also allegedly would hybridize to SEQ ID NO:1 under "some" stringency conditions.

This rejection no longer applies to the claims of record. The claims with language regarding modification of the sequence and hybridization have been deleted.

Moreover, the claims now recite that the gene/nucleic acid is from *Scrophulariales*. New claims have also been added, wherein the nucleic acid is obtained from *Antirrhinum majus*. Kupper fails to disclose or even suggest such a gene or nucleic acid. Additional claims define the recited amino acid and nucleotide sequences of the claimed invention. Kupper does not disclose or suggest such sequences. Nor does Kupper disclose or suggest nucleic acid encoding an amino acid sequence having the high % identities as now claimed, i.e., 70, 80 or 90%.

In view of the above, withdrawal of this rejection under §102 is respectfully requested and believed to be in order.

Claims 1-4, 6-9, 18-21 and 23-26 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Robinson (U.S. Patent No. 6,242,221). This rejection is respectfully traversed.

Robinson is said to teach nucleic acids encoding polyphenol oxidases. These nucleic acid are said to encode a polypeptide having 64% identity with SEQ ID NO: 2. This nucleic acid is said to be capable of hybridizing to SEQ ID NO: 1 of the instant

invention under some stringency conditions. While Robinson does not teach that the polyphenol oxidase disclosed has the activity to synthesize aurones from chalcones, the specification is quoted as stating that "enzymes having polyphenol oxidase activity clearly have activity to synthesize aurones by using chalcones as substrates (p. 8)." Robinson fails to disclose or even suggest a gene or nucleic acid as now claimed.

Claims with language regarding hybridization under stringency conditions have been deleted; thus the assertion that the nucleic acid would hybridize is irrelevant in view of the instant amendment.

As acknowledged in the Official Action, Robinson does not teach a polypeptide having at least 55% homology over the entire sequence with SEQ ID NO:2. Robinson thus would similarly fail to disclose or suggest a sequence as now claimed encoding a polypeptide having at least 70%, 80% or 90% identity with SEQ ID NO:2.

Nor does Robinson disclose or suggest nucleic acids as now claims, which are obtained from *Scrophulariales* or *Antirrhinum majus*. Robinson also fails to disclose or suggest nucleic acids having the specific sequences as now claimed, e.g., in claims 31-43.

In view of the above, withdrawal of this rejection under §102 is respectfully requested and believed to be in order.

Claims 1-4, 6, 7, 9, 18-21, 23, 24 and 26 have also been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by McBride et al (WO 96/40951). This rejection is respectfully traversed.

McBride et al is said to teach a nucleic acid encoding a protein having activity to synthesize aurones by using chalcones as substrates. McBride is said to teach vectors comprising genes encoding tyrosinases and ORF438 from Streptomyces antibioticus. The encoded polypeptide is asserted to be an amino acid sequence modified by deletion, substitution and/or addition of one or more amino acids relative to SEQ ID NO:2. The McBride polypeptide is said to be capable of hybridizing to SEQ ID NO:1 under "some" stringency conditions, since no weight it given to the recitation of "high" stringency. While McBride et al does not teach that the tyrosinase has the activity of synthesizing aurones by using chalcones, the polypeptide encoded by the nucleic acid of McBride is a tyrosinase and the instant specification teaches that at least one tyrosinase meets the functional requirements of the claims. Moreover, McBride et al is said to describe an alteration in plant color in transgenic plants at page 56.

McBride fails to disclose or even suggest the gene or nucleic acid as now claimed. Claims with language regarding hybridization have been deleted. This aspect of the rejection thus no longer applies to the claims of record.

The claims now recite that the gene/nucleic acid is from *Scrophulariales*. New claims have also been added, wherein the nucleic acid is obtained from *Antirrhinum majus*. McBride fails to disclose or even suggest such a gene or nucleic acid. Additional claims define the recited amino acid and nucleotide sequences of the claimed invention, e.g., claims 31-43. McBride does not disclose or suggest such sequences. Nor does McBride

disclose or suggest the nucleic acid as claimed in claims 38-43, wherein a high degree of identity with SEQ ID NO:2 is required.

In view of the above, withdrawal of this rejection under §102 is respectfully requested and believed to be in order.

In view of the above, it is respectfully believed that all of the claims are in condition for allowance. At the very least, new claims 27-43 have been added to address the Examiner's concerns regarding the claim scope. Claims 27-30 require that the isolated nucleic acid be obtained from *Antirrhinum majus*. Such nucleic acid are described in the specification. *See, e.g.,* the species used in the instant Examples are *Antirrhinum majus* and are identified as such in <213> in the Sequence Listing. Claims 31-35 are directed to the nucleic acid encoding the sequence of SEQ ID NO:2. Claim 36 is directed to the nucleic acid sequence of SEQ ID NO:1. These claims should thus be allowable under §112 and over the prior art. Claims 37-43 have also been added to further define the nucleic acid being claimed. In claims 37, 39, 41 and 43, the claimed nucleic acid must include at least one of the specified sequence of SEQ ID NOs: 3-7. In claims 38-43, the claimed nucleic acid must encode a sequence having a high degree of identity with that of SEQ ID NO:2. The variations to the sequence thus are minimal, and could easily be obtained by one skilled in the art. These nucleic acid are also patentably distinct from that disclosed in the cited prior art.

At the very least, new claims 31-43 are described, enabled and patentably define over the prior art. These claims should, therefore, be allowable.

Further and favorable action in the form of a Notice of Allowance is respectfully requested.

In the event that there are any questions relating to this amendment or the application in general, it would be appreciated if the Examiner would contact the undersigned attorney by telephone at (650) 622-2360 so that prosecution would be expedited.

Respectfully submitted,

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